

**SPECIFICATION
FOR
COOLER-FREEZER, WALK-IN**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers the requirements for walk-in coolers, freezers, or combination cooler/freezers with preassembled remote or field assembled remote type condensing units. It covers units with compartments not less than 8'x 10'x 7'6".

I. CLASSIFICATION

A. THE WALK-IN UNITS ARE CLASSIFIED AS EITHER:

- Cooler only
- Freezer only
- Combination cooler/freezer

Three types of floors are described herein.

B. THE REFRIGERATION UNITS FOR THE ABOVE COOLER/FREEZERS ARE CLASSIFIED AS EITHER:

- Preassembled Remote Systems
- Remote Systems

1. Definitions - The refrigeration system is defined as follows:

- a) Preassembled Remote System - consists of two major assemblies. The condensing unit assembly is supplied with all components factory installed and wired, including the electrical box, time clock, sight glass, drier, suction line filter, pre-wired control panel, circuit breaker, winterizing parts, and other components as required in this specification. Similarly, the refrigeration coil assembly is factory built including the expansion valve, drier, temperature control and heat exchanger. Installation work on the job site is minimal. All tubing and refrigerant required is furnished by the contractor.
- b) Remote System - consists of the same parts as defined in the preassembled remote system with the basic components supplied by the factory and then assembled and installed by the contractor.

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bids shall form a part of this specification:

NSF-7

National Sanitation Foundation (NSF)
P.O. Box 1468
Ann Arbor, MI 48106

NEC Standards

National Electrical Code (NEC)
60 Battery March Street
Boston, MA 02210

ASTM E-84

American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103

Underwriters Laboratories (UL)
333 Pfingsten Road
Northbrook, IL 60062

Factory Mutual Research
P.O. Box 688
Norwood, MA 02062

III. REQUIREMENTS

A. GENERAL

All electrical and electrically operated components, including the condensing unit and the evaporator, are to comply with the requirements of Underwriter's Laboratories for such equipment and be so labeled and/or listed. The walk-in cooler/freezer shall comply with the applicable provisions of the National Sanitation Foundation Standard #7 and have permanent type seal of approval attached to the interior wall adjacent to the door jamb of each compartment door (Do not attach to door itself). Evaporator shall also be NSF listed.

B. DETAILS

1. Panel - Panels shall be sectionally constructed and shall be metal clad. Foamed edges to be tongue and groove and provide a vapor and air-tight seal. No wood shall be used in construction of panels. The individual finished panels shall be certified by Underwriter's Laboratories or Factory Mutual as having a flame spread under 25 and a smoke generation of less than 450 when tested in accordance with ASTM E-84.

They shall have a Class I building type fire rating. Approval of core rated material only does not constitute a finished product and therefore is not acceptable. **A copy of the certification must be supplied with the bid when specified.**

2. Panel Joining - Panels shall be joined together by the use of rotating "cam-lock" devices or similar type fasteners concealed within the panel. Access to the fasteners to be gained through an access opening with tight fitting cover (plug button) located on the interior surface. The plug buttons shall be flush with metal skin of panel. Fastening devices shall be strong enough and furnished in sufficient quantity to provide air-tight joints. Fasteners joining panel ends shall be spaced on maximum centers of 24" but with a minimum of one per panel end. Fasteners joining panel

sides shall be spaced on maximum centers of 40" but with a minimum of three per side.

3. Exterior Finishes

- a) Ceiling may be #24 (minimum) U.S. gauge electro-deposited (minimum) grain galvanized steel (Galvanized or equivalent), or .032 (minimum) NSF approved embossed aluminum alloy sheets.
- b) Walls to be .032" (minimum) NSF approved embossed aluminum alloy sheets.
- c) Doors shall match walls.
- d) Floor material to be same as ceiling. Installing contractor to coat floor pad with non-hardening mastic.

4. Interior Finishes

- a) Ceiling to be same as exterior walls in 3.b., above.
- b) Wall and door same as exterior walls in 3.b., above.
- c) Floors to be #14 (minimum) U.S. gauge electro-deposited minimum grain galvanized steel.

5. Insulation

- a) General: To be foamed in place urethane with a minimum density of 2 lbs/cu ft., a 97% closed cell construction, and to have an Underwriters' Laboratories flame spread rating of 25 or less. UL label, listing, or other satisfactory evidence of compliance shall be furnished as requested.
- b) The walls, doors, ceiling, and floor of each cooler, freezer, or combination cooler/freezer to have an average coefficient of heat transfer (U) not to exceed .03 BTU/hr/sq.ft.

C. FLOORS

All floors Type I and II to be capable of supporting distributed floor load of 600 lbs. per sq. ft.

Type I - Type I floors are an integral part of the cooler, freezer and are used when the unit is to be placed on top of the existing building floor. Unit shall be sealed to floor with mastic and the perimeter sealed with a waterproof adhesive. The sectional panels shall be as previously described in Section III, Paragraphs B.1. through B.5. Interior horizontal and vertical surfaces shall intersect in an NSF cove. Provide safety walk(s) consisting of treated fabric strips cemented to the floor to give an overall non-slip surface. Where no shelving is called for, the entire floor area is to be given this "non-slip" treatment.

Type II - Type II floor are identical to Type I except that the unit is to be placed in a recessed pit so the interior floor is level with the building floor. The mastic shall extend up the exterior perimeter of the unit a distance equal to the depth of the pit. The recessed pit should be lined with polyethylene film. After installation of the unit, the space between it and the sides of the pit should be filled with a suitable filler and the exterior perimeter above the building floor line be sealed to the floor as for Type I floors above.

Type III - Type III floors are not an integral part of the cooler, freezer, or combination cooler/freezer, but are a part of the building floor any may or may not be insulated as stated in the invitation for bids. This type of installation is used when it is desired that the unit interior floor be flush with the building floor, and in the case of a new building, an insulated

floor section is built for the unit, or, in the case of an existing building, it is impractical to cut out the floor for a Type II installation.

Walk-in units for installation on a Type III floor shall be furnished with floor "screeds" constructed and furnished with locking devices as described under Section III.B.2. above and finished to match panel surface adjacent above. Attach screeds securely to floor and seal on inside and outside.

D. DOORS

Door panel to have same construction as wall panels. The cooler and freezer section shall be fitted with doors as shown on the bid drawing or as called for in the Invitation for Bids. Doors shall have the minimum opening dimensions of 34" wide by 75" high and shall be of the in fitting flush mount type. Doors shall be fitted with a vinyl or neoprene gasket to form an air-tight seal and be fitted with sufficient spring loaded, cam-action lift hinges for proper support and to give it self-closing action and prevent the "sweeping" of dirt and contaminants into the compartment on closing. Doors shall be fitted with a positive action type latch which is operable from within the unit for safety. All exterior door latches shall be provided with a padlock-type hasp which will prevent opening from the outside but will not prevent opening from within. The jambs and head of all exterior doors shall have plastic breaker strips between the inner and outer shell. Anti-sweat heater element shall be furnished when strips are specified. The door itself shall be of a heavy reinforced construction similar to the wall panels, insulated in a like manner, and finished to match the adjacent surface on the interior and exterior. Doors shall be mounted so that in the closed position a full perimeter seal is maintained at all times. Gasket shall be water, oil and sunlight resistant. Gasket shall be easily replaceable. Doors shall be provided with adjustable double wiper strip and provided with minimum 12 gauge threshold plate.

E. VENTS

Each freezer or freezer compartment shall be provided with a heated pressure-vacuum relief vent of an approved design to relieve internal pressure or vacuum. Location shall be such to insure proper operation of vent.

F. HARDWARE

All hardware to be heavy duty, to be sturdy, and functionally designed for easy use and clean ability.

G. SHELVING

Shelving, if required, shall be furnished as described in the Invitation for Bids.

H. MISCELLANEOUS

1. Trim - When installed adjacent to walls or ceilings in such manner as to create an inaccessible space, matching metal trim panels shall be installed to close the space. Trim shall be securely attached to the box and adjacent wall(s), ceiling and/or floor.
 - a) Rigidly framed with sufficient framing members of the required dimensions and materials.
 - b) Panels to be covered in a material matching box exterior.

- c) Where access to refrigeration components concealed by the filler panels is required, filler panels are to have an easily removable access opening, for inspecting, maintaining, and replacing components.
- 2. Thermometer - NSF listed, dial or LED digital type, to be supplied with all door sections.

I. REFRIGERATION EQUIPMENT

1. Evaporator(s)

- a) Cooler Section(s) - Evaporator unit to be of the direct expansion, fan-coil type, designed for the usage called for on the Invitation for Bids. It shall operate at 35°F and be furnished complete with condensate pan and drain line strainer, liquid solenoid valve, and thermostatic type expansion valve with sensing bulb located on the evaporator coil suction line so as to provide maximum cooling under full load. Fan motors shall be designed and rated for continuous duty service on the power source specified and shall be provided with a motor "off/on" switch to cut the fan(s) off for routine maintenance, etc. When the fan motor(s) do not come with "built-in" over and under current protection, then the "off/on" switch shall be of the "motor sentinel" type incorporating over-current and undercurrent running protection. Fan switch to be wired in such manner as to close refrigerant liquid solenoid and put system into "pump down" when placed in the "off" position.

Evaporator capacity shall be based on the total surface area of the cooler or cooler compartment and the conditions of 35°F inside, 100°F ambient room temperature, heat transfer coefficient $U = .03 \text{ BTU/hr/sq.ft.}$ 18 hour compressor operation, and the temperature differential between the refrigerant and the compartment being maintained at $10^\circ\text{F} \pm 2^\circ\text{F}$.

Defrosting shall be by off-cycle air over coil type. Compartment temperature to be controlled by a line voltage from thermostat of the proper type and range, operating the solenoid valve in the liquid line ahead of the expansion valve. Mount the thermostat bulb at the rear of the evaporator in the return (warm) air stream.

- b) Freezer Section(s) - Evaporator unit to be of the direct expansion, fan-coil type, designed for the usage called for in the IFB. It shall be designated for sub-freezing temperatures complete with automatic electric resistance type defrost system with all controls, to operate at -10°F. The unit shall be furnished with heated condensate pan and heated insulated drain line, liquid line strainer, liquid solenoid valve, thermostatic type expansion valve (sensing bulb located as for cooler sections), defrost heater elements, and fan delay thermostat. Fan motor and control to be as for cooler sections except as modified under defrost control below.

Evaporator capacity shall be based on the total surface area of the freezer or freezer compartment and the conditions of -10°F inside, 100°F ambient room temperature, heat transfer coefficient $U = .03 \text{ BTU/hr/sq.ft.}$, 18 hour compressor operation, and the temperature differential between the refrigerant and the compartment being maintained at $10^\circ\text{F} \pm 2^\circ\text{F}$. Compartment temperature to be controlled as for cooler sections.

Defrosting cycle shall be activated and deactivated by an automatic timing device adjustable to provide the number and duration of defrost periods required. When defrost cycle begins, timer shall close the liquid solenoid valve, stop the fan, and energize the heating elements in the defroster, condensate pan, and drainline. At the end of the defrost period the timer shall de-energize all of the above heating elements, open the solenoid valve, and energize the fan motor circuit. The fan shall be prevented from running by the fan delay thermostat until the coil temperature drops below 32°F to prevent blowing warm moist air around the compartment.

A safety override thermostat or an electronic means shall be included as part of the defrost control system which will both visually (red light) and audibly (bell, buzzer, etc.) indicate any abnormal rise in compartment temperature due to a power loss, the failure of the defrost cycle to terminate, or the failure of any of the refrigeration cycle components. Alarm to be wired on a separate circuit from panel board and which is independent of the breakers serving the power circuits, lighting circuits, etc. to the box.

J. CONDENSING UNIT(S)

1. General

All condensing units shall be for remote mounting in the location called for on the Invitation for Bids and/or shown on the bid drawing. If no location is given, they may be placed in any suitable location having the owner's approval.

Units shall be a complete unitized package consisting of a mounting frame and/or base, an enclosure suitable to the location, an air cooled condenser with fan, a hermetically or semi-hermetically sealed motor-compressor with high-low pressure cutout and suction and discharge vibration eliminators, liquid filter-drier, moisture indicating sight glass, properly sized liquid receiver, service valves, and all motors, starters, controls, etc. as required for proper operation on the specified power source. All electrical and mechanical connections shall be made and a full and proper charge of refrigerant installed to complete the installation.

- a) Compressor(s) - Both hermetically or semi-hermetically sealed motor-compressors are acceptable on sizes up to and including 1 hp. On sizes larger than 1 hp semi-hermetically sealed units are required. The type and size of compressor required is defined in the Invitation for Bids.

2. Winterizing

When condensing units are specified to be located outdoors, they shall be "winterized" by being provided with a electric crankcase heater for the motor-compressor and a liquid receiver pressure control system to maintain a proper and stable liquified pressure at the expansion valve during periods when the ambient air temperature falls below 50°F. This pressure control system shall vary the effective condensing surface by the proper use of pressure regulating valves and check valves which will proportionately flood the condenser coil with liquid refrigerant and reduce its capacity to that required to maintain the proper pressure. An oversized liquid receiver shall be factory furnished on the unit for summer storage of excess refrigerant. An alternative method is to furnish a fan cycling control in conjunction with a balanced port expansion valve.

- a) Weatherproof Enclosure - When specified in the Invitation For Bid factory (condensing unit manufacturer) furnished enclosure shall be rugged, rigid and fabricated from galvanized metal (or sheet metal, primed and coated with a epoxy paint on all surfaces). The top panel (roof) shall be sloped sufficiently to ensure rain water run off. Any welded joints made with the galvanized material shall be protected (after welding) against corrosion from the weather. The enclosure shall be designed to be easily removed (by two people) or have removable panels to allow access for maintenance.

3. Cooler Compartment(s)

The condensing unit for cooler compartments shall be as described in paragraphs 1 and 2 above, and shall have the capacity in BTU/hour as required to supply liquid refrigerant to the evaporator specified in the Invitation for Bids. The capacity rating shall be based on an evaporating temperature of 25°F., using EPA approved refrigerant, and an ambient air temperature of 90°F.

4. Freezer Compartment(s)

The condensing unit for freezer compartments also shall be as per paragraph 1 and 2 above, with the capacity in BTU/hour as required to supply liquid refrigerant to the evaporator specified in the Invitation for Bids. The capacity rating shall be based on an evaporating temperature of -20°F using EPA approved refrigerant, and an ambient air temperature of 90°F.

K. CONTROLS

To be as specified in the preceding sections.

IV. INSTALLATION OF REFRIGERATION PIPING, ACCESSORIES, AND ELECTRICAL CONNECTIONS

A. ELECTRICAL WORK

All electrical work performed in the field shall be done by a licensed electrical contractor in accordance with the provisions of the National Electrical Code. The electrical contractor shall connect to be indicated junction boxes containing the specified power sources within the building and extend to the unit components. Only two points of insulation penetration will be permitted for electrical work. The penetrating sleeve shall be a section of poly-vinyl-chloride (P.V.C.) plastic conduit secured and sealed in place by the use of electrical conduit lock nuts and felt or rubber washers against the interior or exterior wall faces. There shall be installed, both inside and outside the box on each end of the penetrating sleeve, a seal type fitting and after all wires are pulled, the sleeve shall be sealed in a proper and approved manner.

All wiring outside the box will be run in either rigid galvanized or sherardized, or P.V.C. conduit. Appropriate junction boxes shall be provided where required to assist in pulling wire. Changes in direction will be made by the use of long sweep turns. Short runs to the equipment connections may be made using flexible conduit. Appropriate adapters shall be provided at all points of connection to boxes or equipment.

B. LIGHTING

There shall be installed on the upper part of the door section panel, a vapor proof type light fixture which will accommodate up to a 100 watt bulb and which will be controlled from a toggle switch mounted outside the box adjacent to the door. This switch shall incorporate a red pilot light.

C. REFRIGERANT CONNECTIONS AND HEAT EXCHANGER

All refrigerant connections shall be made by a LICENSED REFRIGERATION CONTRACTOR. If requested, the installer's license must be verified by submitting a photocopy of his license to the Purchase and Contract Division, 116 West Jones Street, Raleigh, N.C. 27603-8002, PRIOR to the commencement of the installation. In addition, we require the installer to show this license to the owner/agency representative if requested. All refrigerant piping shall be Type K copper tubing or de-hydrated Type L: 5/8" and over to be hard-drawn, sizes below 5/8" may be soft tempered. Wrought copper sweat fittings shall be used on all hard-drawn tubing. Flared fittings are permissible for soft-drawn tubing. Slope suction lines down in direction of flow 1/8"/ft.

Only one point of penetration through the box insulation will be permitted for refrigerant connections. A non-conducting sleeve shall be tightly fitted through the box and with all refrigerant lines passing through the sleeve. Sleeve to be packed with an approved non-hardening mastic such as "Perma-Gum". The suction line shall be wrapped or fitted with an insulation similar to or equal to Armstrong's Armflex from point of connection at the condensing unit up to the point of entrance to the penetrating sleeve (where run outside and exposed to elements provide a weatherproof sheath covering over insulation). All piping shall be installed in a neat and workmanlike manner rigidly secured by clamps extending around the outside of the insulation and connected to the adjacent surface. Joints in all hard refrigerant piping shall be made utilizing brazing type solder.

The drain line from the evaporator unit pan shall be run to and along the outside of the compartment to indirectly discharge through a trap (See Section XI, N.C. Plumbing Code) into an open waste receptor, floor drain, etc., and must be sloped or graded properly toward and terminate at least 2" above the same. This line may be made up of copper tubing, galvanized steel pipe or PVC pipe with appropriate fittings. Penetration through the box wall shall be in the manner previously described for the refrigerant and electrical lines.

A properly sized heat inter-changer (exchanger) shall be installed as close to evaporator unit as possible.

V. WARRANTY

The contractor warrants to the owner that all equipment furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any part or parts which by reason of defect in material, manufacture or installation shall fail under normal use, free of negligence or accident, for a minimum period of 12 months on the complete unit and four additional years on the motor-compressor unit. Panels to be warranted for 10 years from the date of acceptance.

Such warranty shall cover the cost of all service, parts, labor and travel/shipping to and from point of service.

VI. SPARE PARTS, AND OPERATION MANUALS

Two (2) copies of a spare parts and operation manual shall be supplied at the completion of the installation. (This can be supplied in the form of total system level parts break down or as separate individual subsystem break down.)

VII. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

The contractor shall be responsible for the initial start-up, and proper operation of equipment. An acceptance inspection will be conducted by the Quality Assurance Representative of the Division of Purchase and Contract prior to release of payment. The contractor must request the inspection, as directed in the Invitation For Bids.

VIII. DELIVERY AND PAYMENT

Delivery of and payment for equipment under this specification shall be in accordance with the terms and conditions stated in the Invitation For Bids.

IX. ORDERING DATA

Purchasers should exercise any desired option herein and should specify the following in the Requisition and Invitation For Bids:

1. Title, number, and date of this specification.
2. Specify whether the cooler only, freezer only, or combination cooler/freezer.
3. Size of the Walk-In desired.
4. Specify preassembled remote refrigeration system or remote system. (See para. I. B.)
5. Size of compressor (HP) and use of unit.
6. Type of floor to be furnished and insulation if Type III floor.
7. Description of shelving, if required.
8. If filler panels are required.
9. If coved molding around perimeter is desired.
10. If weatherproof roof cap is required.(state type)
11. If fluorescent light type interior handle is desired.
12. If weatherproof enclosure is required over the condensing unit.
13. Type of compressor to be furnished. (See para. III. J.1.(a))
14. If photocopy of license is required.
15. If UL or FM certification is required.

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